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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/827,318

04/20/2004

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EXAMINER

TRINH, HOA B

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/827,318	<b>Applicant(s)</b> ASAHI ET AL.	
	<b>Examiner</b> HOA B. TRINH	<b>Art Unit</b> 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe (Pub. No. US 2003/0136577).

Abe discloses, as to claims 1, 9, a semiconductor device substrate comprised of a core substrate 10 (fig. 1) on both surfaces of which interconnect patterns 20 (20a, 20b), 24, 28 (fig. 1) are formed via a resin layer 14 (fig. 1), wherein the core substrate 10 is formed by a material (page 4, Table 1, paragraph [0053]) having a heat expansion coefficient, and a (first) resin layer 30 (fig. 1, page 3, paragraph [0045] and page 4, paragraph [0063], Table 1) forming an outermost layer of the substrate 10 on each of the main surfaces thereof of a material having at least one of a higher strength and a higher elongation than a resin material used for (second) inner resin layers 22 and 26 (fig. 1) in the substrate 10, except that Abe does not explicitly state that the material for the core substrate is selected so that it is closer to that of a semiconductor chip than the respective heat expansion coefficients of the (third) main resin layers 14 (fig. 1) and the interconnect patterns 20, 24, 28 (fig. 1), wherein the core substrate 10 having respective interconnects patterns 24, 28 (fig. 1) extends through the resin layers 14, 22, 26, 30 (fig. 1). Nonetheless, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct the invention of Abe with the selection of materials as provided in Table 1, since it is a prima facie obvious to an artisan for optimization and experimentation to select the available materials in Table 1 for the advantage of preventing cracking, deformation, and other problems arising in the substrate due to the thermal stress occurring between the core substrate and the inner resin layers in the substrate and interconnect patterns in the substrate (see page 4, [0063]).

Note: The resin layers 14, 22, 26, 30 (fig. 1) may be selected among the disclosed group of materials (page 4, [0063]) so as to provide the outermost layer with the higher strength and elongation than the inner layer because the results are predictable.

As to claims 2, and 6, Abe further discloses that a resin layer 26 (fig. 1, page 3, paragraph [0045] and page 4, paragraph [0063], Table 1) under the resin layer 30 (fig. 1) forming the outermost layer of the substrate 10 is made of a resin material having at least one of a higher strength and higher elongation than the resin material of the resin layer 14 or 22 (fig. 1) used further inside the substrate 10 (fig. 1).

As to claims 3, 10, and 7, Abe further discloses that the resin material forming the outermost layer 30 has a fracture strength of at least 90 Mpa and elongation of at least 10%. (See page 4, paragraph [0063], Table 1) Note: example of such material is a polyimide resin.

As to claims 4, and 8, Abe discloses the resin material forming the outermost layer 30 (fig. 1) has a fracture strength of at least 90 Mpa and elongation of at least 10%. (See page 4, paragraph [0063], Table 1) Note: example of such material is a polyimide resin.

As to claim 5, Abe discloses a semiconductor device substrate comprised of a core substrate 10 (fig. 1) on both surfaces of which interconnect patterns 20 (20a, 20b), 24, 28 (fig. 1) are formed via a resin layer 14 (fig. 1), wherein the core substrate 10 is formed by a material (page 4, Table 1, paragraph [0053]) having a heat expansion coefficient closer to that of a semiconductor chip than those of the main resin layers 14, 22, 26, 30 (fig. 1) and the interconnect patterns 20, 24, 28 (fig. 1) inside the substrate, and a resin layer 30 (fig. 1, page 3, paragraph [0045] and page 4, paragraph [0063], Table 1) forming an outermost layer of the substrate 10 on each of the opposite main surfaces (fig. 1) thereof of a material having at least one of a higher strength and a higher elongation than a resin material used for inner resin layers 14, or 22 or 26 (fig. 1) in the substrate 10, wherein the core substrate 10 having respective interconnects patterns 24, 28 (fig. 1) extends through the resin layers 14, 22, 26, 30 (fig. 1).

5. Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe in view of Nair (2004/0095734).

Abe discloses the invention substantially as claimed, except that the core substrate being of a metal alloy.

Nair discloses an analogous device having a core substrate 211 (fig. 2E) made of an iron-nickel alloy (see page 2, paragraph [0026]) for providing a high capacitance substrate.

Therefore, as claims 11-15, it would have been obvious to one of ordinary skills in the art at the time the invention was made to material of the core substrate of Abe with the iron nickel alloy material, as taught by Nair, for providing the advantage as mentioned in the above.

### ***Response to Arguments***

1. Applicant's arguments filed 11/09/2007 have been fully considered but they are not persuasive.

Regarding to applicants' arguments, again, the examiner disagrees with applicants because as stated in Abe, page 4, paragraph [0053], the substrate core layer is formed of material that has a thermal heat expansion coefficient that is approximate to that of a silicon. A semiconductor substrate may be made of a silicon substrate, thereby making the core layer suitable for the claimed limitation. Furthermore, the selection of material for the insulating layer is obvious because the result is predictable. Although applicants argue that the prior art needs to "identify the reason by the person of ordinary skill in the art would combined the prior art in the manner as claimed", the court has foreclosed the argument that a specific teaching, suggestion, or motivation is required to support a finding of obviousness. (see KSR International

Co. v. Teleflex Inc., 550 U.S. - , 82 USPQ2d 1385 (2007). Thus, Abe meets the present claim's limitation. Claims 2-10 fall with claim 1 reasoning.

The examiner maintains the rejection because applicants have not yet overcome the cited prior art.

#### **Conclusion**

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Vikki Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Wael Fahmy, can be reached at (571) 272-1705. The office fax number is 703-872-9306.

Any request for information regarding to the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Also, status information for

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published applications may be obtained from either Private PAIR or Public Pair. In addition, status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see if you have questions pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

/(Vikki) Hoa B Trinh/  
Examiner, Art Unit 2814

/Howard Weiss/  
Primary Examiner, Art Unit 2814